

IGBT MODULE (U series) 1200V / 75A / PIM



■ Features

- Low $V_{CE(sat)}$
- Compact Package
- P.C. Board Mount Module
- Converter Diode Bridge Dynamic Brake Circuit

■ Applications

- Inverter for Motoe Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply

■ Maximum ratings and characteristics

● Absolute maximum ratings ($T_c=25^{\circ}\text{C}$ unless otherwise specified)

Item		Symbol	Condition		Rating	Unit	
Inverter	Collector-Emitter voltage	V _{CES}			1200	V	
	Gate-Emitter voltage	V _{GES}			±20	V	
	Collector current	I _C	Continuous	T _C =25°C	75	A	
				T _C =80°C	50		
		I _{CP}	1ms	T _C =25°C	150		
				T _C =80°C	100		
		-I _C			75		
		-I _C pulse	1ms	150			
Collector power dissipation	P _C	1 device		275	W		
Brake	Collector-Emitter voltage	V _{CES}			1200	V	
	Gate-Emitter voltage	V _{GES}			±20	V	
	Collector current	I _C	Continuous	T _C =25°C	35	A	
				T _C =80°C	25		
		I _{CP}	1ms	T _C =25°C	70		
				T _C =80°C	50		
	Collector power dissipation	P _C	1 device		160	W	
	Repetitive peak reverse voltage	V _{R_{RRM}}			1200	V	
Converter	Repetitive peak reverse voltage	V _{R_{RRM}}			1600	V	
	Average output current	I _O	50Hz/60Hz sine wave		75	A	
	Surge current (Non-Repetitive)	I _{FSM}	T _J =150°C, 10ms		520	A	
	I ² t (Non-Repetitive)	P ² t	half sine wave		1352	A ² s	
Operating junction temperature		T _J			+150	°C	
Storage temperature		T _{stg}			-40 to +125	°C	
Isolation voltage	between terminal and copper base *2	V _{iso}	AC : 1 minute		AC 2500	V	
	between thermistor and others *3				AC 2500	V	
Mounting screw torque					3.5 *1	N·m	

*1 Recommendable value : 2.5 to 3.5 N·m (M5)

*2 All terminals should be connected together when isolation test will be done.

*3 Two thermistor terminals should be connected together, each other terminals should be connected together and shorted to base plate when isolation test will be done.

● Electrical characteristics (T_j=25°C unless otherwise specified)

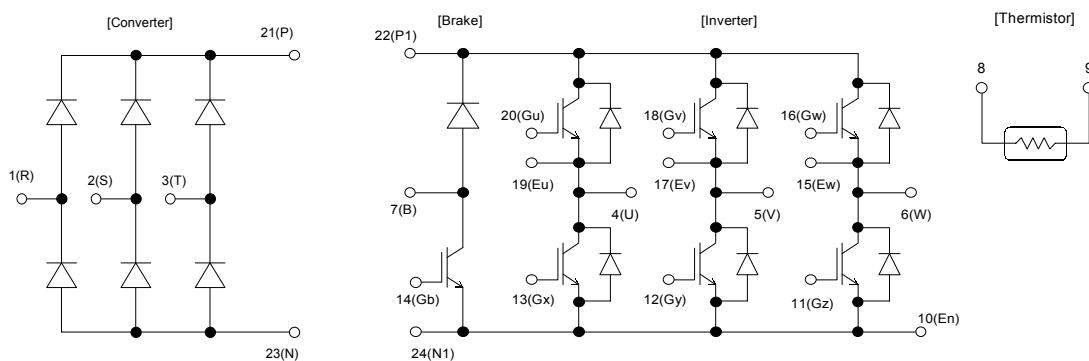
Item		Symbol	Condition		Characteristics			Unit
					Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V		-	-	1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V		-	-	200	nA
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, Ic=75mA		4.5	6.5	8.5	V
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V Ic=75A	Tj=25°C	-	2.35	2.80	V
				Tj=125°C	-	2.75	-	
		VCE(sat) (chip)	Tj=25°C	-	2.00	2.45		
			Tj=125°C	-	2.40	-		
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz		-	6	-	nF
	Turn-on time	ton	VCC=600V		-	0.53	1.20	µs
		tr	Ic=75A		-	0.43	0.60	
		tr(i)	VGE=±15V		-	0.03	-	
	Turn-off time	toff	RG= 22 Ω		-	0.37	1.00	
		tf			-	0.07	0.30	
	Forward on voltage	VF (terminal)	VGE= 0 V If=75A	Tj=25°C	-	2.15	2.50	V
				Tj=125°C	-	2.35	-	
		VF (chip)	Tj=25°C	-	1.80	2.15		
			Tj=125°C	-	2.00	-		
	Reverse recovery time	trr	If=75A		-	-	0.35	µs
Brake	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V		-	-	1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V		-	-	200	nA
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	Ic=35A VGE=15V	Tj=25°C	-	2.30	2.75	V
				Tj=125°C	-	2.65	-	
		VCE(sat) (chip)	Tj=25°C	-	1.95	2.40		
			Tj=125°C	-	2.30	-		
	Turn-on time	ton	VCC=600V		-	0.53	1.20	µs
		tr	Ic=35A		-	0.43	0.60	
	Turn-off time	toff	VGE=±15V		-	0.37	1.00	
		tf	RG= 43 Ω		-	0.07	0.30	
	Reverse current	IRRM	VR=1200V		-	-	1.0	mA
Converter	Forward on voltage	VFM	If=75A	terminal	-	1.40	1.75	V
			VGE=0V	chip	-	1.30	-	
	Reverse current	IRRM	VR=1600V		-	-	1.0	mA
Thermistor	Resistance	R	T=25°C		-	5000	-	Ω
			T=100°C		465	495	520	
	B value	B	T=25/50°C		3305	3375	3450	K

● Thermal resistance Characteristics

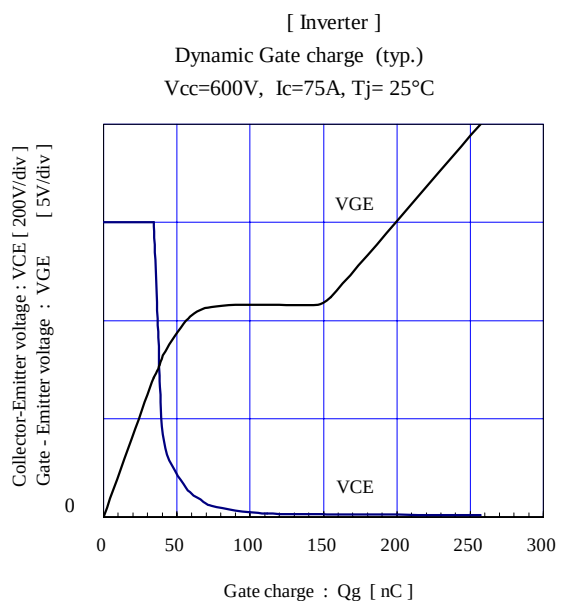
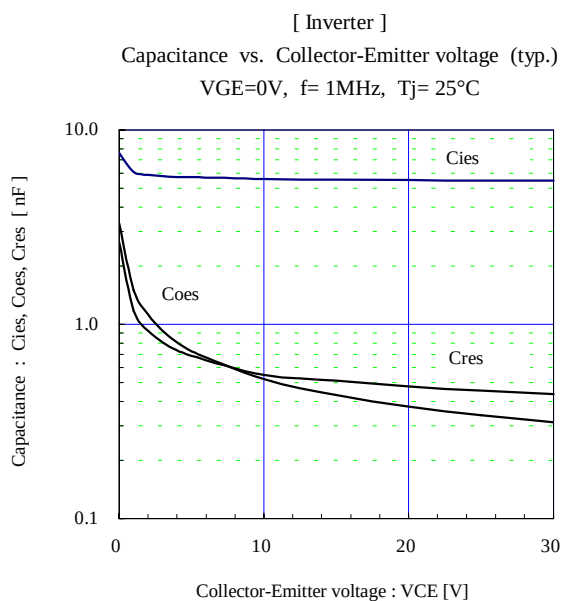
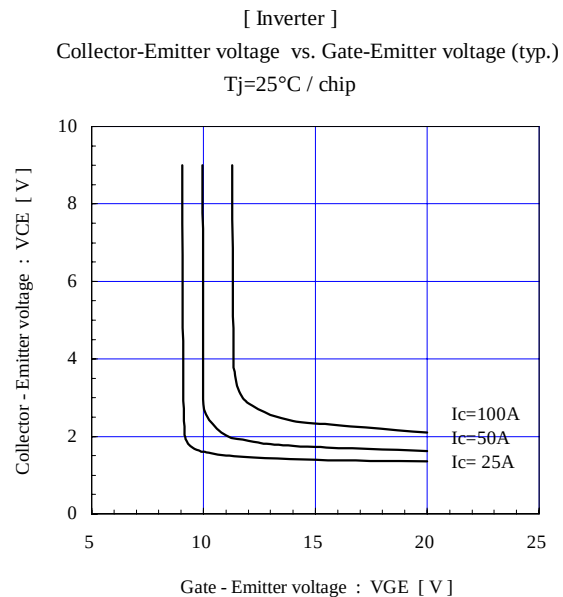
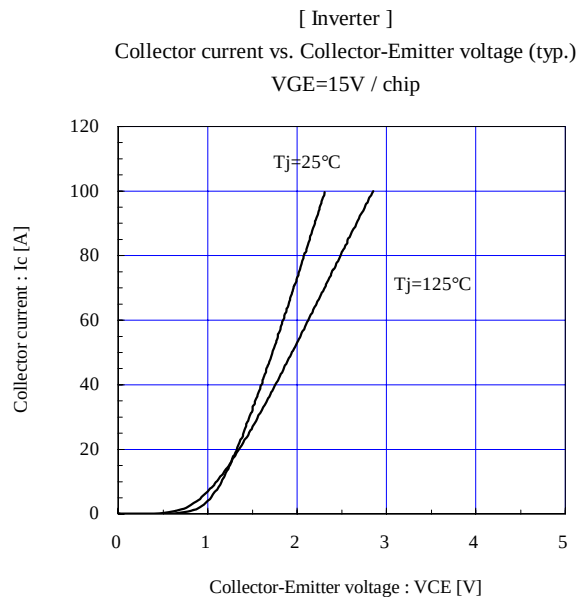
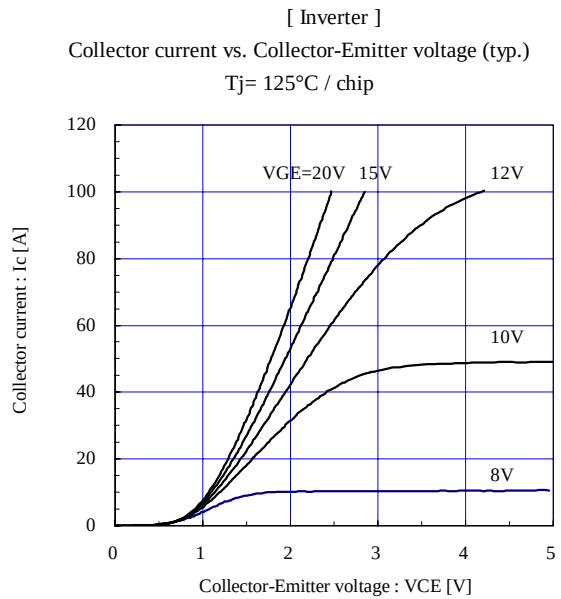
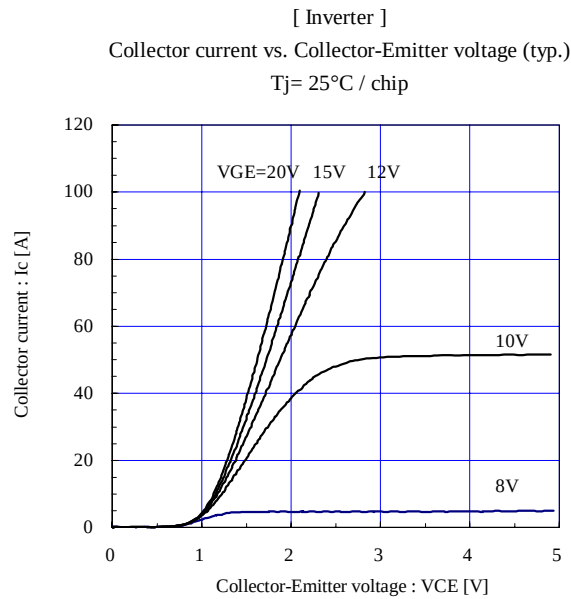
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	R _{th(j-c)}	Inverter IGBT	-	-	0.45	°C/W
		Inverter FWD	-	-	0.73	
		Brake IGBT	-	-	0.76	
		Converter Diode	-	-	0.50	
		With thermal compound	-	0.05	-	
Contact thermal resistance *	R _{th(c-f)}	With thermal compound	-	0.05	-	

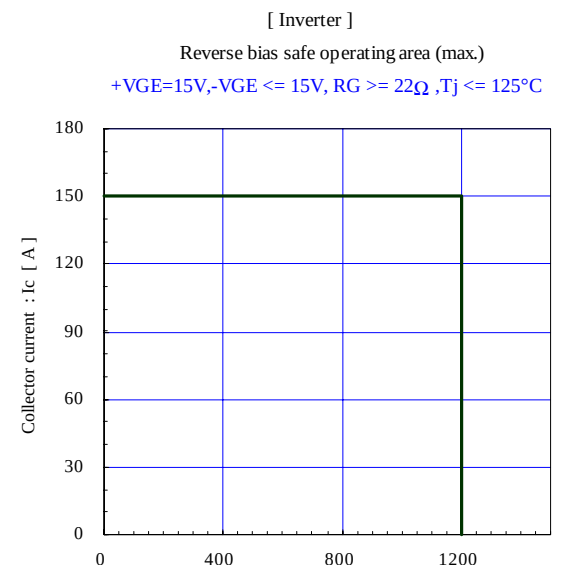
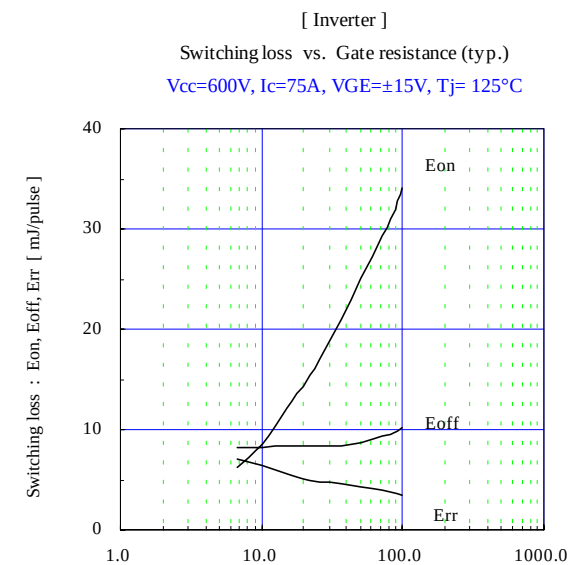
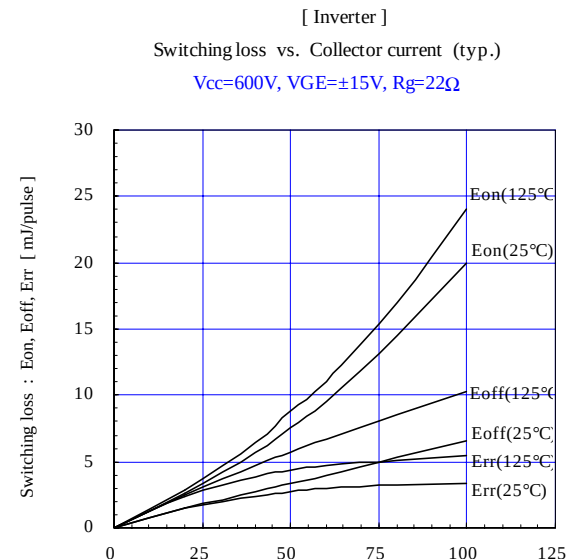
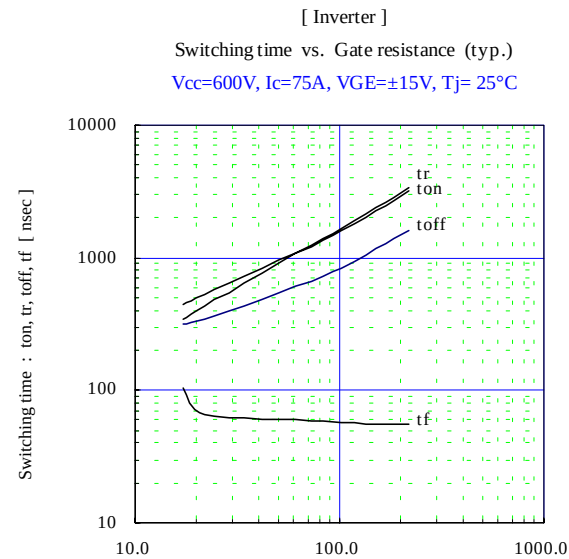
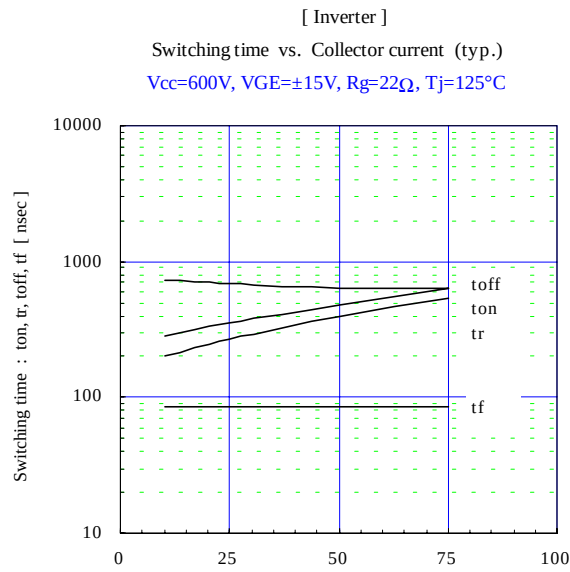
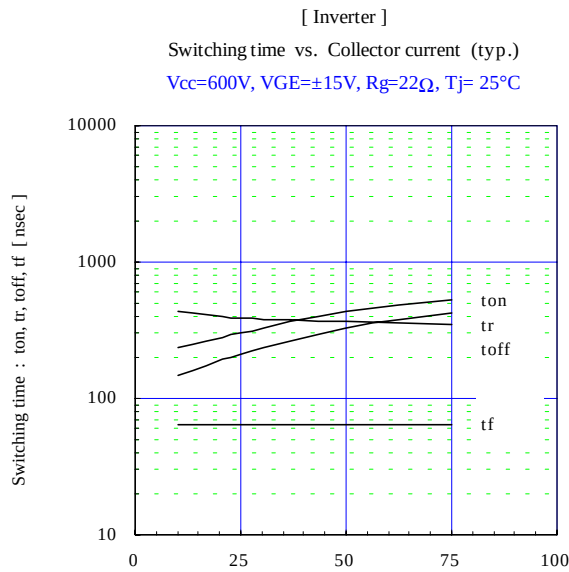
* This is the value which is defined mounting on the additional cooling fin with thermal compound

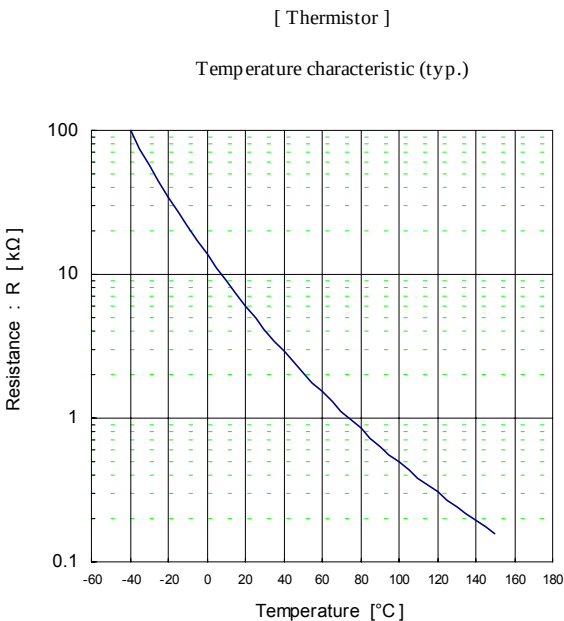
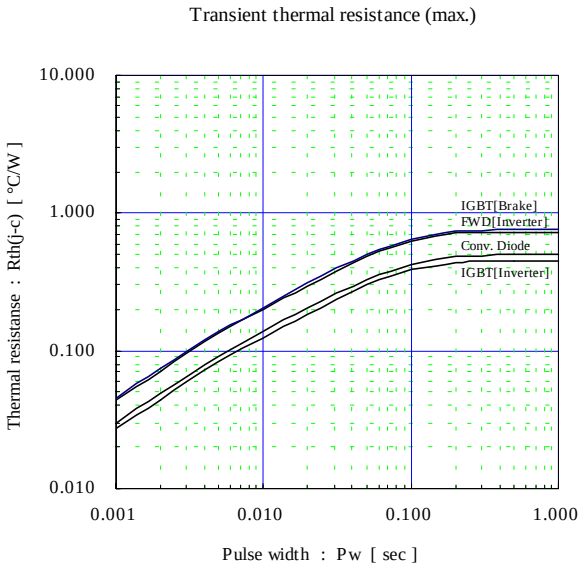
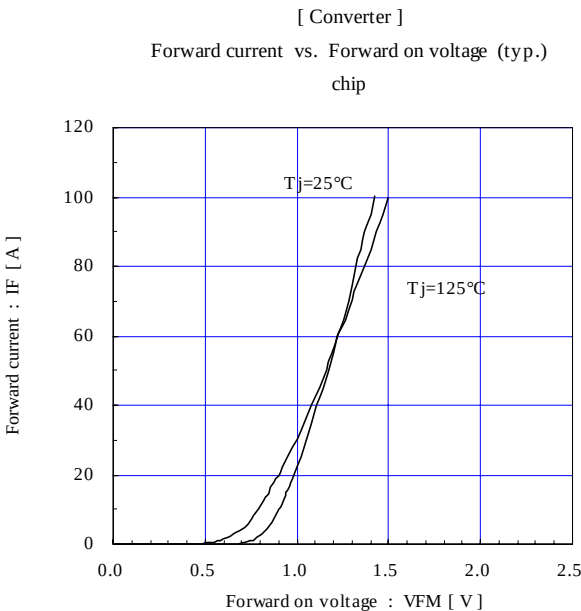
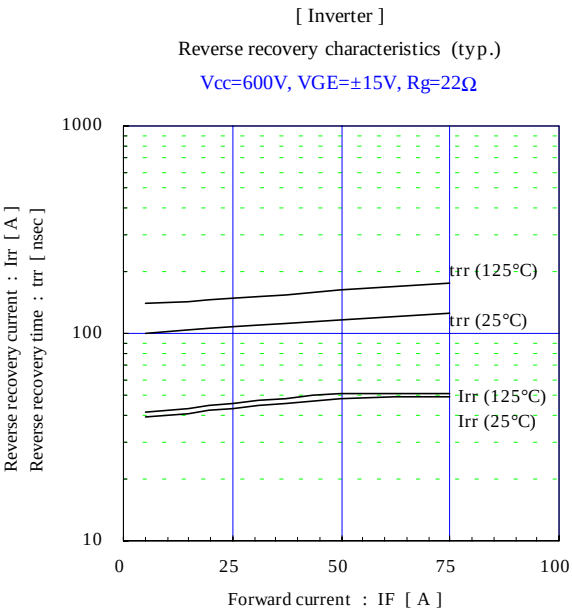
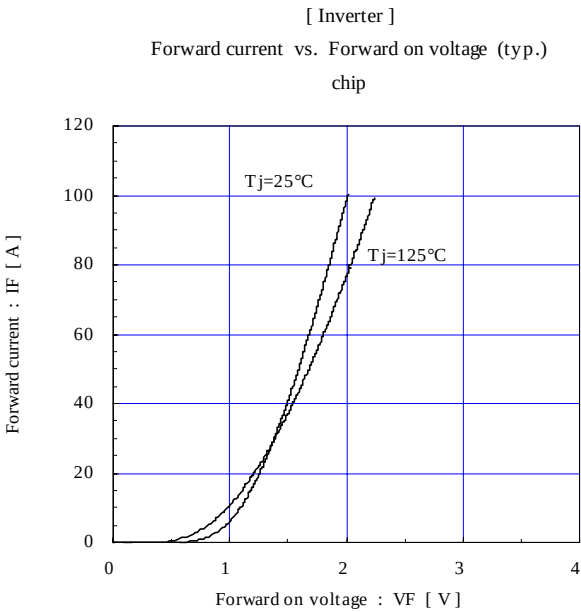
■ Equivalent Circuit Schematic

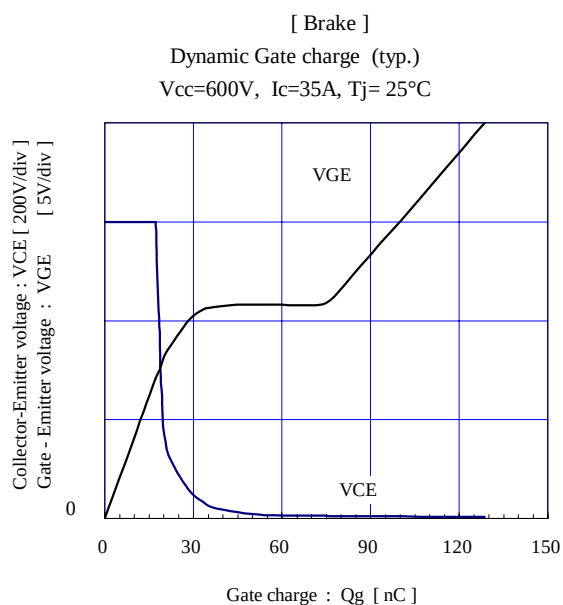
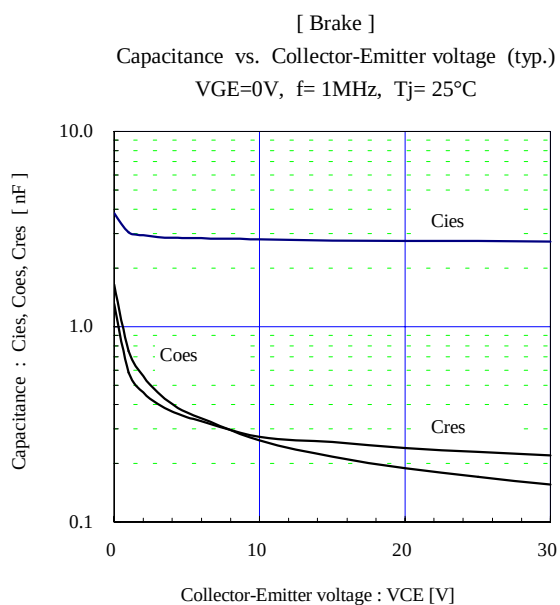
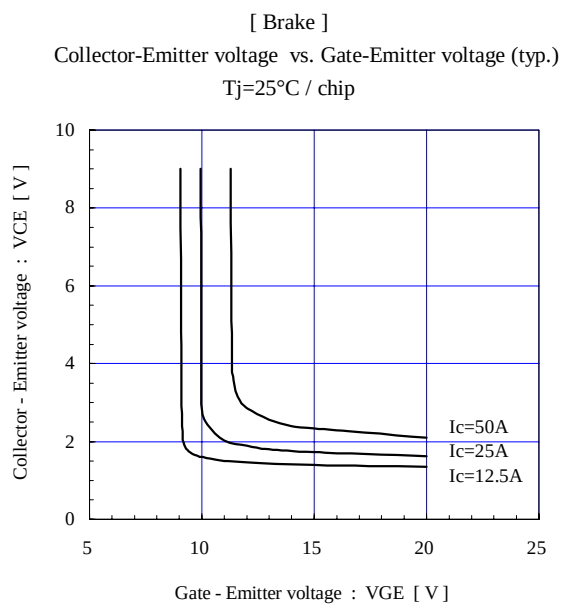
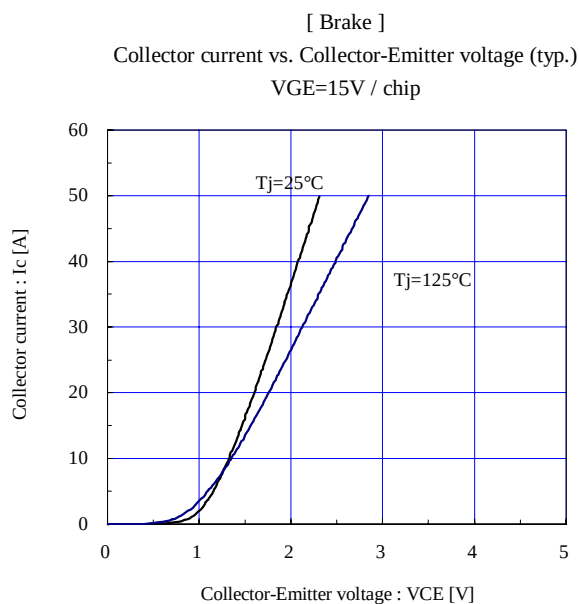
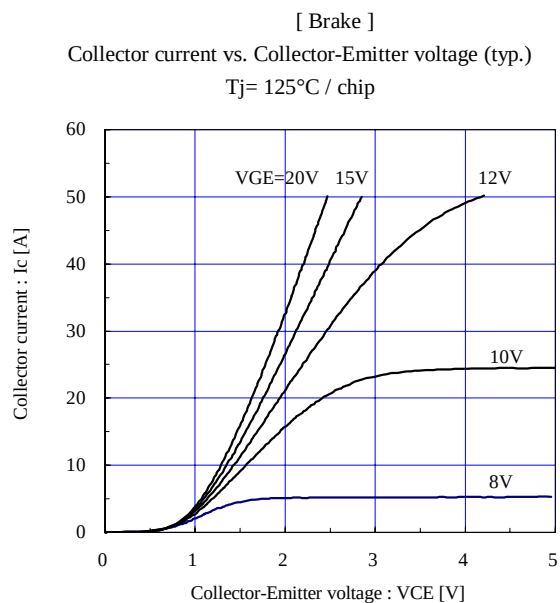
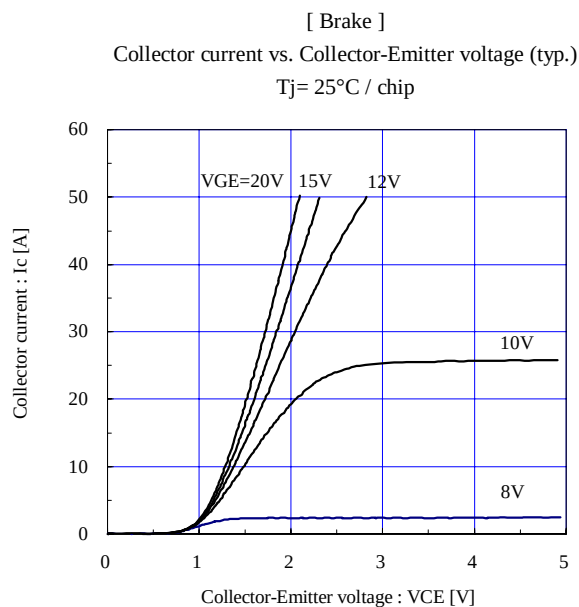


■ Characteristics (Representative)









■ Outline Drawings, mm

